From x-ray telescopes to neutron focusing

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Abstract

In the case of neutrons the refractive index is slightly less than unity for most elements and their isotopes. Consequently, thermal and cold neutrons can be reflected from smooth surfaces at grazing-incidence angles. Hence, the optical technologies developed for x-ray astronomy can be applied for neutron focusing. The focusing capabilities of grazing incidence neutron imaging optics have been successfully demonstrated using nickel mirrors. The mirrors were fabricated using an electroformed nickel replication process at Marshall Space Flight Center. Results of the neutron optics experiments will be presented. Challenges of the neutron imaging optics as well as possible applications of the optics will be discussed.